

REMARKS

In the Office Action of July 18, 2006, claims 1-14 were rejected under 35 U.S.C. 101 for failing to recite a practical application of an idea resulting in a useful, concrete and tangible result. Further, claims 1, 3 – 12, and 14 - 19 were rejected under 35 U.S.C. 103(a) as unpatentable over P. Rothman, Nonlinear Time Series Analysis of Economic and Financial Data (Kluwer Academic Publishers, 1999) in view of Asherman et al. (U.S. Patent No. 6,384,748) in further view of Wood (Wood, Robert A., Market Microstructure Research Databases: History and Projections, 18 Journal of Business & Economic Statistics, 140 (Apr. 2000)); and claims 2 and 13 were rejected under 35 U.S.C. 103(a) over these references in view of U.S. Patent 6,536,935 to Parunak et al.

Applicants' invention is directed to methods of filtering time series data by testing for certain errors. These errors include decimal error, scaling error, domain error, a monotonic series of quotes and a long series of quotes.

The nature of these errors is described in the specification. The testing of decimal errors is described in paragraphs 0323-0344 of the published application (page 44 to 48 of the specification). As explained in paragraph 0324, a decimal error can occur when cache memories are updated by partial updates of varying length rather than full refreshment of data and a specific example of a decimal error is described in paragraph 0325. If a partial update message is lost, the portion remaining in the cache may no longer be correct and subsequent quotes may be in error. Such errors are called decimal errors in the specification.

Scaling errors are described at paragraphs 0345 to 0357 (pages 48 to 50 of the specification). These errors are changes in the scale of a quote by a constant factor relative to prior quotes. Such changes might arise as a result of devaluation or a change in quoting habits.

Domain errors are described at paragraph 0284 of the published application (page 40, line 15 of the specification as filed) which states: "A domain error: an illegal level p of the filtered variable, i.e., $p < P_{\min}$ (as opposed to a merely implausible level)." Examples of domain errors in the case of bid-ask quotes are identified in paragraphs 0287, 0288, 0289 and 0292: $p_{\text{bid}} < p_{\min}$, $p_{\text{ask}} < p_{\min}$, $p_{\text{ask}} < p_{\text{bid}}$. To understand the nature of the first two of these errors, it is necessary to realize that p_{\min} is the lower limit of the allowed domain of quotes as set forth in paragraph 0276. Thus, there is a domain error if a bid, p_{bid} , or an ask, p_{ask} is less than this lower

limit. With respect to the last two examples of domain errors, since the bid should be less than the asking price, there is a domain error if $p_{ask} < p_{bid}$ or $p_{ask} < \underline{p}_{bid}$.

A monotonic series of quotes is a series of quotes that rise or fall steadily. Such a series is sometimes inserted in the time series intentionally as described at paragraph 0379 to 0398 of the application.

A repeated series of quotes is a series of identical quotes. Such a series is sometimes inserted intentionally in the time series as described at paragraph 0399 to 0419.

Claim 1 recites a method of filtering time series data by testing for decimal error, scaling error, domain error and data credibility. The Examiner concedes in paragraph 2 of the Office Action that Rothman does not expressly disclose testing data for decimal, scaling and domain errors. Indeed, Rothman's concern is testing for non-linearities. The Examiner attempts to make up for the deficiencies of Rothman by asserting that Asherman discloses testing for decimal point errors and scaling errors and that Wood teaches testing for domain errors. Applicants respectfully submit that Asherman's decimal point errors and scaling errors are not the decimal and scaling errors of applicants' claims 1 and that the error described by Wood is not a domain error claimed by applicants.

For a teaching about decimal point errors and scaling errors, the Examiner relies on Col. 6, lines 10-25 of Asherman which indicate that decimal points are aligned and that trailing zeroes are removed if the scale of the result exceeds the scale of the number being operated on. These are not, however, what applicants are referring to as decimal and scaling errors. First, it must be noted that applicants' claims recite decimal errors not decimal point errors. Second, as described in applicants' paragraphs 0322 to 0344 the decimal error that applicants are referring to is an error that arises when a cache is updated using partial update messages of varying length and one of those update messages is lost. In this situation, subsequent partial update messages may assume that the cache data contains a decimal digit of a certain value established by the lost message when, in fact, the cache contains a different decimal digit established by an earlier message. As will be apparent, this is not the same as the alignment of decimal points that is described by Asherman and likewise is not suggested by Asherman. Rather, the cited and quoted lines from Asherman are part of the definition of the operation of subtraction, which, being performed on string data, requires the initial step of aligning the two strings so that

corresponding decimal positions will be combined in the digit-by-digit subtraction operation. At no point does Asherman address the validity of the data he proposes to manipulate.

The scaling errors that are addressed by applicants are the scaling of quotes by a constant factor compared to prior quotes. These might arise in the event of a revaluation of currency, a stock split or a change in quoting practices. Applicants' process tests for scaling errors by testing for substantial changes between a new quote and a previous quote as detailed in paragraph 0348. Asherman, however, does not test for errors in scale and does not suggest such testing. Rather, Ackerman simply adjusts the scale of a result if it exceeds the scale of the number being operated on.

With respect to Wood, the error he describes is the presence of a price of \$4 in the middle of a series of prices at about \$40 per share. This is not a domain error. As noted above, a domain error is defined at paragraph 0284 of the application as an illegal value as opposed to a merely implausible level. Nothing in Wood suggests that the \$4 price is an illegal value in the sense that it is impossible in the series of prices. Rather, the \$4 price appears to be implausible but that does not make it a domain error. Indeed, Wood offers the explanation that the error is likely to have arisen when "the marked sense card reader on the floor of the NYSE dropped a digit." Thus, the error appears to be a mechanical error.

Since Rothman admittedly does not describe testing for decimal, scaling or domain errors and since Asherman does not describe or suggest testing for decimal and/or scaling errors and Wood does not describe or suggest testing for domain errors, these references alone or in combination cannot be said to disclose or suggest applicants' method of performing such tests as recited in claim 1.

Claim 1 is believed patentable over the references for the additional reason that the references do not suggest their combination. In particular, while Rothman and Wood disclose testing of time series data, Asherman describes a data encoding process and does not describe or suggest testing of time series data. As a result, there is no suggestion in the references that Asherman be combined with either Rothman or Wood and no suggestion that it be combined with both.

Dependent claims 2 through 10 are believed patentable for the same reasons claim 1 is patentable. The dependent claims are believed patentable for the additional reason that the references do not disclose the processes recited therein.

With respect to claim 2, while Parunak may disclose a monotonic price range, he does not suggest the step of detecting a monotonic series of quotes in the context of a process for filtering time series data. Likewise, Rothman, Asherman and Wood do not suggest this step.

With respect to claim 3, the Examiner is respectfully requested to provide a citation to a specific reference disclosing the step of detecting a long series of quotes.

Claims 4-8 are believed patentable because the Asherman reference does not disclose a process for testing for decimal error. And while Wood asserts that he has developed various error filters he does not describe the errors they correct except for one example of a pricing error or how it is done.

Dependent claim 9 is believed patentable for the additional reason that the references do not disclose the step of testing for an illegal level of the time series data.

Independent claim 11 recites a method of filtering time series data including the step of testing for decimal error. It is believed patentable because the references do not teach a process for testing for decimal error.

Dependent claims 12-19 are believed patentable for the same reasons claim 11 is patentable. Several of these claims are similar to dependent claims 2-10 and are believed patentable for the same reason.

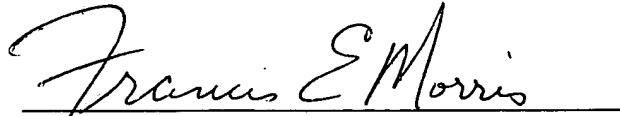
The rejection of claims 1-14 under 35 U.S.C. 101 for lack of a practical application is respectfully traversed. The Rothman and Wood references cited by the Examiner are but a small sampling of the work being done on time series financial data. Such work is being done because it has practical applications resulting in useful, concrete and tangible results. The Signature Financial patent at issue in the Static Street v. Signature Financial decision related to a system for generating a number representing the value of a mutual fund holding at the end of the day. Such a system was found to produce a useful, concrete and tangible result. Fundamentally, that number was a quote and a series of such numbers is one example of time series financial data. Just as the system of the Signature Financial patent was found to produce a useful, concrete and tangible result, so too the process of the present invention produces useful, concrete and tangible results.

No additional fee is believed to be due for filing this response. However, if a fee is due, please charge such fee to Morgan, Lewis & Bockius LLP Deposit Account No. 50-0310.

If the Examiner believes a telephone interview would expedite prosecution of this application, she is invited to call applicant's attorney at the number given below.

Date: October 18, 2006

Respectfully submitted,

A handwritten signature in cursive script, reading "Francis E. Morris", written over a horizontal line.

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